Space Weather Forecast

Issued on Thursday, 19 January 2023 at 12:38 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Minor/Moderate Radio Blackouts likely. Chance of G1/Minor Geomagnetic Storms through to day 3 (21 Jan).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate through the past 24 hours, with three low level M-class flares observed, two emanating from a small region in the northeast, the other from the remnants of a former region in the southwest of the disc. The largest region is now approaching centre disc in the southern hemisphere, with the other relatively large and complex region also approaching centre disc in the north, and which still contains a very weak but more magnetically complex spot configuration. There are currently a total of eight numbered and one un-numbered sunspot regions on the visible disc, with the remaining regions smaller and appearing either stable or in slight decay, except the re-emergence of some weak spots associated with a region in the southwest.

No new Earth-directed CMEs have been observed in available coronagraph imagery.

Solar Wind / Geomagnetic Activity: The solar wind speeds were at slightly elevated to background levels. The Interplanetary Magnetic Field increased a little after 19/0400UTC reaching moderate levels. The important north-south component was mostly weakly positive (northward) until around 19/0300UTC, with more sustained negative (southward) orientation thereafter. Geomagnetic activity was largely Quiet (Kp 0-2), with Potsdam and NOAA/SWPC recording an Unsettled period 19/0600-0900UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Moderate, with a slight chance of reaching High levels, with two large and complex sunspot regions on the visible disc the more likely sources.

Solar Wind / Geomagnetic Activity: A CME that was launched on 14 January may give a glancing blow early on Day 1(19 Jan). A further coronal hole fast wind may connect with Earth during Day 2 (20 Jan) into day 3 (21 Jan), this could potentially increase solar wind speeds to elevated levels from background to slightly elevated speeds, although this is low confidence. Winds should ease back on day 4 (22 Jan)

Geomagnetic activity is expected to be Quiet to Unsettled with occasionally Active intervals possible, and a Chance of isolated G1/Minor Storm intervals through to day 3 (21 Jan), lowering to a slight chance on day 4 (22 Jan) as CH HSS effects start to wane.

Energetic Particles / Solar Radiation: Solar radiation will most likely remain at background levels, but with a slight chance of enhancements to S1 or greater through the period, in

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association with any larger flares.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	40	30	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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